BRUHAT BANGALORE MAHANAGARA PALIKE
BYTARAYANPURA DIVISION

Name of Work: Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division

3rd & PART BILL

TEST REPORTS

TEJUS CONSULTANTS
CONSULTING ENGINEERS AND DESIGNERS
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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

oject	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division
ent	BRUHAT BANGALORE MAHANAGARA PALIKE
nsultant	M/s Tejus Consultants
ntractor	Benaka Developers & Project Pvt.Ltd.

pe of Material	WMM	Proposed Use	WMM
mple Location	At plant	Date of Sampling	18.01.2020
		Date of Testing	18.01.2020

Size of aggregate		Flakiness Index		Elongation Index	
Passing rough IS eve, mm	Retained on IS sieve, mm	Total wt. of aggregate retained on sieves (A) gms.	Wt. of aggregate passing from Flakiness gauge (B) gms	Wt. of aggregate retained on Flakiness gauge (C) gms	Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	848	74	774	50
16.0	12.5	1208	104	1104	126
12.5	10.0	452	73	379	62
10.0	6.3	492	64	428	38
Total		3000	315	2685	276

te: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.50
Elongation Index(%):	10.28
Combined FI+EI, (%)	20.78

te:
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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Benaka Developers & Project Pvt.Ltd.
Date of Testing	:	18.01.2020
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	**Date of Sampling:**	18.01.2020
Type of material & Purpose:	WMM	**Date of testing:**	18.01.2020
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	412	412	4.12	95.88	95-100
22.4	2534	2946	29.46	70.54	60-80
11.2	1780	4726	47.26	52.74	40-60
4.75	1492	6218	62.18	37.82	25-40
2.36	1376	7594	75.94	24.06	15-30
0.6	886	8480	84.80	15.20	8.0-22.0
0.075	832	9312	93.12	6.88	0-8
Pan	688				
Total	10000				

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BRUHAT BANGALORE MAHANAGARA PALIKE
BYTARAYANPURA DIVISION

Name of Work: Improvement of Drains and Asphalting to Road at Dasarahalli Surrounding area in Ward No.06 (Thanisandra), Byatarayanapura Sub Division

3rd & PART BILL

TEST REPORTS

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Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Project	Improvement of Drains and Asphalting to Road at Dasarahalli Surrounding area in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers & Project Pvt.Ltd.		
Date of Testing	14.01.2020		
Layer no. or level	WMM I layer		
Depth of hole	250mm		
Field density:	1	2	3
Wt. of wet material from hole (Ww) gms.	6169	6118	6211
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9732	9732	9715
Wt. of sand in cone (w3) gms.	835	842	830
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3433	3426	3455
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.35	2.36	2.35
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.09	2.09	2.09
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.28	98.32	98.22
Compaction Required	98%	98%	98%

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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvement of Drains and Asphalting to Road at Dasarahalli Surrounding area in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Benaka Developers & Project Pvt.Ltd.
Date of Testing	:	14.01.2020
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	Date of Sampling:	14.01.2020
Type of material & Purpose;	WMM	Date of testing:	14.01.2020
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	414	414	4.14	95.86	95-100
22.4	2536	2950	29.50	70.50	60-80
11.2	1794	4744	47.44	52.56	40-60
4.75	1484	6228	62.28	37.72	25-40
2.36	1372	7600	76.00	24.00	15-30
0.6	870	8470	84.70	15.30	8.0-22.0
0.075	832	9302	93.02	6.98	0-8
Pan	698				
Total	10000				

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Improvement of Drains and Asphalting to Road at Dasarahalli Surrounding area in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Benaka Developers & Project Pvt.Ltd.

Type of Material		WMM		Proposed Use	WMM
Sample Location		At plant		Date of Sampling	14.01.2020
				Date of Testing	14.01.2020
Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	Retained on IS sieve, mm	Total wt. of aggregate retained on sieves (A) gms.	Wt. of aggregate passing from Flakiness gauge (B) gms	Wt. of aggregate retained on Flakiness gauge (C) gms	Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	854	74	780	50
16.0	12.5	1210	112	1098	120
12.5	10.0	444	72	372	62
10.0	6.3	492	65	427	38
Total		3000	323	2677	270

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.77
Elongation Index(%):	10.09
Combined FI+EL (%)	20.85

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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

Project	Improvement of Drains and Asphalting to Road at Dasarahalli Surrounding area in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers & Project Pvt.Ltd.		
Proposed Use	WMM	Date of Sampling	14.01.2020
Sample Location	At plant	Date of Testing	14.01.2020

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	364.00	354.00	358.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	274.00	268.00	272.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	90.00	86.00	86.00	
4	Aggregate Impact Value (%)	(Wc/Wa)* 100	24.73	24.29	24.02	
5	Average Aggregate impact value	(%)	24.35			Max - 30 %

Remarks : Satisfactory / Not Satisfactory

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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

ject	Improvement of Drains and Asphalting to Road at Dasarahalli Surrounding area in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
ent	BRUHAT BANGALORE MAHANAGARA PALIKE		
sultant	M/s Tejus Consultants		
tractor	Benaka Developers & Project Pvt.Ltd.		
posed	BC	**Date of Sampling**	05.02.2020
ple tion	At plant	**Date of Testing**	05.02.2020

No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	380.00	392.00	344.00	
	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	292.00	300.00	264.00	
	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	88.00	92.00	80.00	
	Aggregate Impact Value (%)	(Wc/Wa)*100	23.16	23.47	23.26	
5	Average Aggregate impact value	(%)	23.29			Max - 30 %

marks : Satisfactory / Not Satisfactory

te:

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ಬಿಬಿಎಂಪಿ ಮೈಸೂರು ರಸ್ತೆ ವಿಭಾಗ

Authorised Signatory

ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಮೈಸೂರು ರಸ್ತೆ ವಿಭಾಗ
ಬಿ.ಬಿ.ಎಂ.ಪಿ, ಬೆಂಗಳೂರು-24

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project :	Improvement of Drains and Asphalting to Road at Dasarahalli Surrounding area in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor:	Benaka Developers & Project Pvt.Ltd.

Type of Material	BC	Proposed Use	BC
Sample Location	At plant	Date of Sampling	05.02.2020
		Date of Testing	05.02.2020

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	Retained on IS sieve, mm	Total wt. of aggregate retained on sieves (A) gms.	Wt. of aggregate passing from Flakiness gauge (B) gms	Wt. of aggregate retained on Flakiness gauge (C) gms	Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	626	70	556	65
16.0	12.5	1242	110	1132	86
12.5	10.0	532	70	462	62
10.0	6.3	500	50	450	50
Total		2900	300	2600	263

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.34
Elongation Index(%):	10.12
Combined FI+EL (%)	20.46

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GRADATION FOR BC
(As per MORT&H 500-18,Grading-2)

Name of Work	:	Improvement of Drains and Asphalting to Road at Dasarahalli Surrounding area in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Benaka Developers & Project Pvt.Ltd.
Date of Testing	:	05.02.2020
Type of Mix	:	BC
Sample I/D	:	BC3

Sample Location:	At plant	Date of Sampling:	05.02.2020
Type of material & Purpose:	BC	Date of testing:	05.02.2020
		Oven Dry Wt.(gms):	1200.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	146	146.0	12.17	87.83	79 - 100
9.50	122	268.0	22.33	77.67	71 - 95
4.75	214	482.0	40.17	59.83	53 - 71
2.360	148	630.0	52.50	47.50	42 - 58
1.180	138	768.0	64.00	36.00	34 - 48
0.600	104	872.0	72.67	27.33	26 - 38
0.300	96	968.0	80.67	19.33	18 - 28
0.150	76	1044.0	87.00	13.00	12 - 20
0.075	68	1112.0	92.67	7.33	4 - 10
Pan	88.0				
Total	1200.0				

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DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvement of Drains and Asphalting to Road at Dasarahalli Surrounding area in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers & Project Pvt.Ltd.
Date of Testing :	05.02.2020
Type of Mix :	Tack coat
Sample I/D :	1

Determination	Unit	Test No		
		1	2	3
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.784	0.790	0.766
Final weight of plate after application of tack Coat (c)	Kg	0.807	0.813	0.789
Weight of tack Coat (d=c-b)	Kg	0.023	0.023	0.023
Rate of spread of tack coat	Kg/sq.m	0.250	0.256	0.251
Average	Kg/sq.m	0.252		
Specified Limit	Kg/sq.m	**0.250 Kg/sq.m**		

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

Name of Work :	Improvement of Drains and Asphalting to Road at Dasarahalli Surrounding area in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers & Project Pvt.Ltd.
Date of Testing :	05.02.2020
Type of Mix :	BC
Sample I D :	BC1

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DETERMINATION OF BITUMEN CONTENT

Description	Trail 1	Trail 2
Weight of Mixture before extraction, g	862	846
Weight of Mixture after extraction, g	816	802
Weight of Bitumen	46	44
Weight of filter paper before extraction, g	2.00	2.00
Weight of filter paper after extraction, g	4.10	4.00
Weight of fines, g	1.40	1.70
Weight of Bitumen & fines	47.40	45.70
Bitumen content in %	5.50	5.40
Average Bitumen content in %	5.45	
Minimum Bitumen content in %	5.40	

GRADATION FOR BC AFTER EXTRACTION

(As per MORT&H 500-18,Grading-2)

Sample Location:	At site	Date of Sampling:	05.02.2020	
Type of material & purpose:	BC	Date of testing:	05.02.2020	
		Oven Dry Wt.(gms):	816.0	

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	82	82.0	10.05	89.95	79 - 100
9.50	114	196.0	24.02	75.98	71 - 95
4.75	118	314.0	38.48	61.52	53 - 71
2.360	126	440.0	53.92	46.08	42 - 58
1.180	82	522.0	63.97	36.03	34 - 48
0.600	68	590.0	72.30	27.70	26 - 38
0.300	72	662.0	81.13	18.87	18 - 28
0.150	42	704.0	86.27	13.73	12 - 20
0.075	48	752.0	92.16	7.84	4 - 10
Pan	64.0				
Total	816.0				

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BRUHAT BANGALORE MAHANAGARA PALIKE
BYTARAYANPURA DIVISION

Name of Work: Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division

3rd & PART BILL

TEST REPORTS

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Test Report on Cement

TEJUS

Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and Cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bangalore Mahanagar Palike
Consultant	TEJUS CONSULTANTS
Contractor	Benaka Developers & Project Pvt.Ltd.
Sample ID	Cement
Date of Sample Tested	03.12.2019
Sample Supplied By	Agency

Sl.No.	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 12269-1987
1	a) Initial Setting Time	IS-4031 (Part-5)	39 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part-5)	350 Minutes	Not More than 600 Minutes
2	Soundness	IS-4031 (Part-3) By the Le-Chatelier method	4mm	Not More than 10 mm
3	Standard Consistency	IS-4031 (Part-4)	26.00%	25 % to 35

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TEST REPORT

Clients	BRUHAT BENGALORE MAHANAGARA PALIKE
Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.

SPECIFIC GRAVITY AND WATER ABSORPTION

FINE AGGREGATE (IS-2386-PART-3)

Type of Material	Fine aggregate (River Sand/ M sand)	Proposed Use	concrete
Location/Source	At Site/Plant	Date of Sampling	03.12.2019
Period of Soaking	24 hours	Date of Testing	03.12.2019

Sl. No.	Test Property	TRIAL - 1	TRIAL - 2	TRIAL - 3	
A	Weight of sturated surface dry sample gm.	650	678	656	
B	Weight of oven - dry sample gm.	643	670	648	
C	Weight of Pycnometer Filled with water gm	1275	1275	1275	
D	Weight of Pycnometer + sample + water gm	1684	1704	1691	
E	Bulk specific gravity $\frac{B}{(C+A-D)}$	2.668	2.691	2.700	2.686
G	Absorption (%) $\frac{(A-B)*100}{B}$	1.089	1.194	1.235	1.172

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike
Project	Improvement to Drains and Asphalting to Roads at Padma Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Consultants	Tejus Consultants, Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.

SIEVE ANALYSIS

Total Weight:	3000 gms		
Type of Material	Fine aggregate (River Sand/ M sand)	Proposed Use	concrete
Sample Location	At Site/Plant	Date of Sampling	03.12.2019
		Date of Testing	03.12.2019

IS Sieve Size	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing (Zone-II)
10.00 mm	0	0	0	100.00	100
4.75 mm	205	205	6.83	93.17	90 - 100
2.36 mm	305	510	17.00	83.00	75 - 100
1.18 mm	410	920	30.67	69.33	55 - 90
0.600 mm	478	1398	46.60	53.40	35 -59
0.300 mm	761	2159	71.97	28.03	8-30
0.150 mm	638	2797	93.23	6.77	0 - 10
Pan	203	3000			-

Remarks : Satisfactory / Not Satisfactory

Note:

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike
Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and Cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.
Total Weight:	10000 gms

SIEVE ANALYSIS

Type of Material	20 mm down size	Proposed Use	Concrete
Sample Location	Plant/At site	Date of Sampling	03.12.2019
		Date of Testing	03.12.2019

IS Sieve Size	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing
40.00 mm	0	0	0	100	100
20.00 mm	270	270	2.70	97.30	95 - 100
10.00 mm	4840	5110	51.10	48.90	25 - 55
4.75 mm	4218	9328	93.28	6.72	0 - 10
Pan	672	10000			

Remarks : Satisfactory / Not Satisfactory

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike	
Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division	
Consultants	TEJUS CONSULTANTS	
Contractor	Benaka Developers & Project Pvt.Ltd.	
Total Weight:	10000	gms

SIEVE ANALYSIS

Type of Material	12.5 mm down size		Proposed Use	CONCRETE	
Sample Location	At Site/Plant		Date of Sampling	03.12.2019	
			Date of Testing	03.12.2019	
IS Sieve Size (in mm)	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing
20.0	0	0	0	100	100
12.5	550	550	5.50	94.50	90-100
10.0	4645	5195	51.95	48.05	40-85
4.75	4538	9733	97.33	2.67	0-10
Pan	267	10000			

Remarks : ✓ Satisfactory / Not Satisfactory

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TEJUS
CONSULTANTS

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bangalore Mahanagar Palike
Consultant	TEJUS CONSULTANTS
Contractor	Benaka Developers & Project Pvt.Ltd.
Grade of concrete:	M20
Size of cube:	150x150x150 mm
Reference IS code:	IS:516-1959

Sl.No.	Date of Casting	Date of testing	Age of Test	Weight of Cube	Area of Cube	Failure load	Compressive strength	Avg. Compressive strength
				Kg	mm^2	KN	N/mm^2	N/mm^2
1	03.12.2019	10.12.2019	7 days	8.120	22500	287	12.76	12.70
2	03.12.2020	10.12.2020	7 days	8.130	22500	284	12.62	
3	03.12.2021	10.12.2021	7 days	8.140	22500	286	12.71	

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